



**O**regon  
**P**ublic  
**H**ealth  
**A**ssociation

14 October 2019



***Domestic Well Testing Data  
From Real Estate Transactions:***

***A Data Source for Arsenic, Nitrate  
and Coliform Contaminants  
in Private Well Water***

*Carol A. Trenga, PhD, MS*



- 💧 **Domestic Well Safety Program**

- 💧 Domestic Well Testing Act

- 💧 Contaminants and Results

- 💧 Public Health Actions

- 💧 Ongoing Projects

**PRESENTATION**

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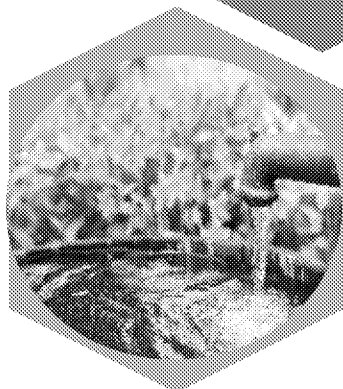


## Mission

Promote domestic well safety to well users throughout the state.

regular testing  
and maintenance  
of private  
domestic wells.

DWSP  
encourages



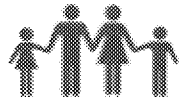
DWSP is  
here to  
help

well users understand the  
quality of their drinking  
water and treatment  
options, if needed.

## PURPOSE

Oregon  
**Health**  
Authority

# Private Wells are NOT regulated by the Federal Safe Drinking Water Act



~23% of Oregonians are  
well dependent



350,000 active wells  
3,800 new wells/year

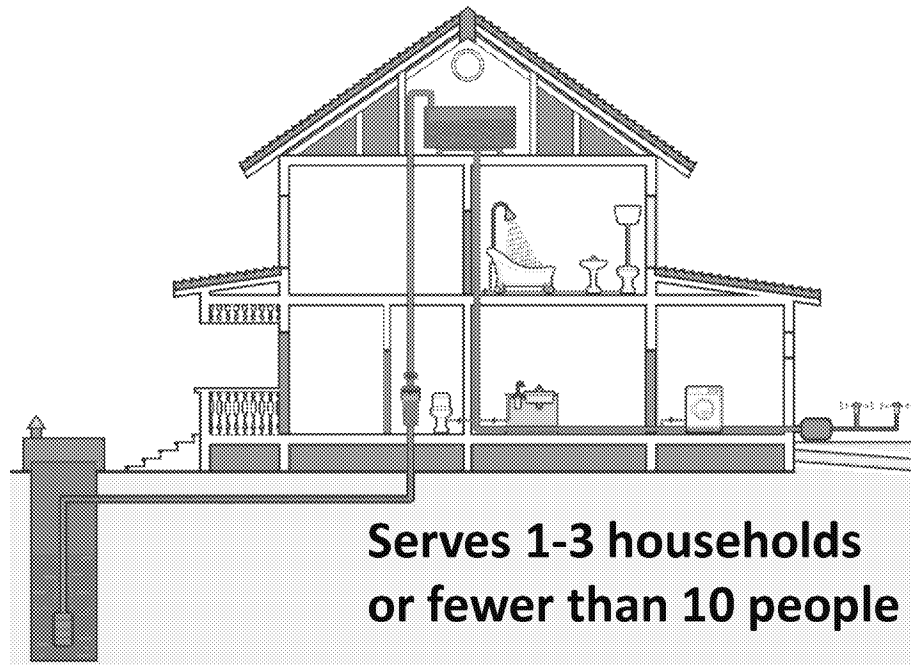


image source: Allstate  
<http://blog.allstate.com/well-water-buying-a-home/>

## BACKGROUND

Oregon  
**Health**  
Authority

- 💧 Domestic Well Safety Program
- 💧 **Domestic Well Testing Act (1989)**
- 💧 Contaminants and Results
- 💧 Public Health Actions
- 💧 Ongoing Projects

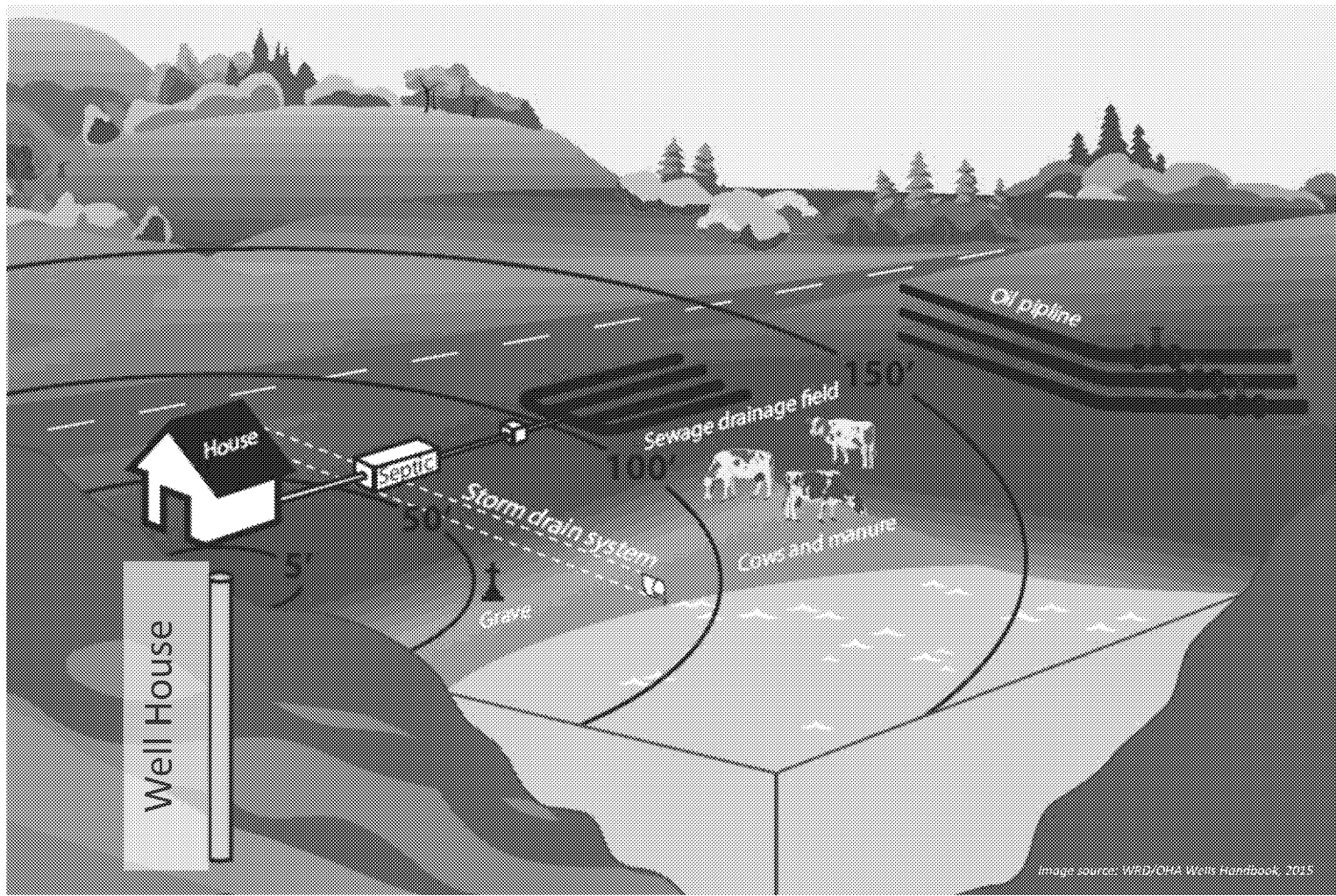
PRESENTATION

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In any transaction for the sale or exchange of real estate that includes a well that supplies ground water for domestic purposes, **the seller of the real estate shall, upon accepting an offer to purchase that real estate, have the well tested for arsenic, nitrates and total coliform bacteria.** The Oregon Health Authority also may, by rule, require additional tests for specific contaminants in specific areas of public health concern. **The seller shall submit the results of the tests required under this section to the authority and to the buyer within 90 days of receiving the results of the tests.**

# What is the purpose of the DWTA?

- Potential buyers are informed of water quality and can negotiate any treatment costs with the seller.
- DWSP receives sample results and notifies well users of any exceedances, based on the MCL set for drinking water by the EPA.
- Public health agencies can identify individuals or communities exposed to high levels of drinking water contaminants and provide information on health-protective measures.



## CONTAMINATION SOURCES & SETBACKS

Oregon  
**Health**  
Authority



Well House

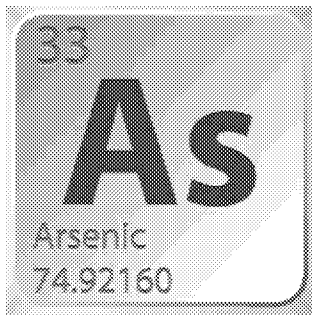


## CONTAMINATION SOURCES

Oregon  
Health  
Authority

- 💧 Domestic Well Safety Program
- 💧 Domestic Well Testing Act (1989)
- 💧 **Contaminants and Results**
- 💧 Public Health Actions
- 💧 Ongoing Projects

PRESENTATION



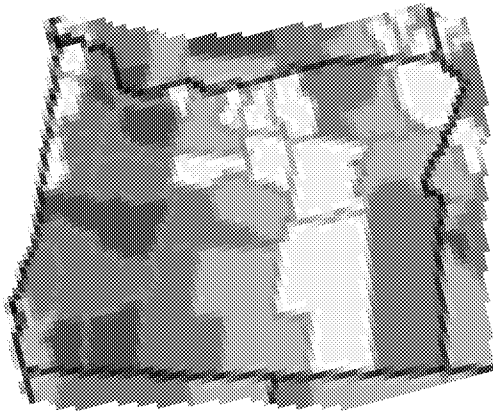
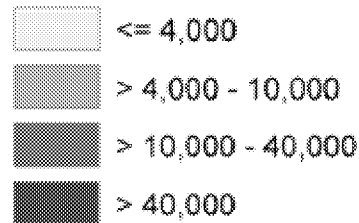
- ◆ Drinking water standard (MCL): 10 ppb; MCL Goal = 0 ppb
- ◆ CA OEHHA Public Health Goal for As = 0.004 ppb. PHG is a contaminant concentration in drinking water that *poses no significant health risk if consumed for a lifetime*.
- ◆ Health Effects: impaired cognitive development, cancer, skin lesions, cardiovascular disease, diabetes, *IQ decrements in children with long-term exposure  $\geq 5$  ppb*
- ◆ Recommended testing: 1X or every 5 years if elevated

Image sources: Live Science <http://www.livescience.com/29522-arsenic.html>

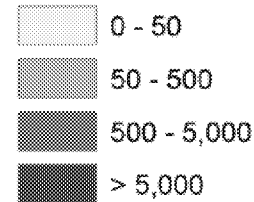
## CONTAMINANTS

# Arsenic Estimates for Domestic Well Users

## Domestic well population



## Estimated Population with Arsenic $> 10 \mu\text{g/L}$



(Public domain.)

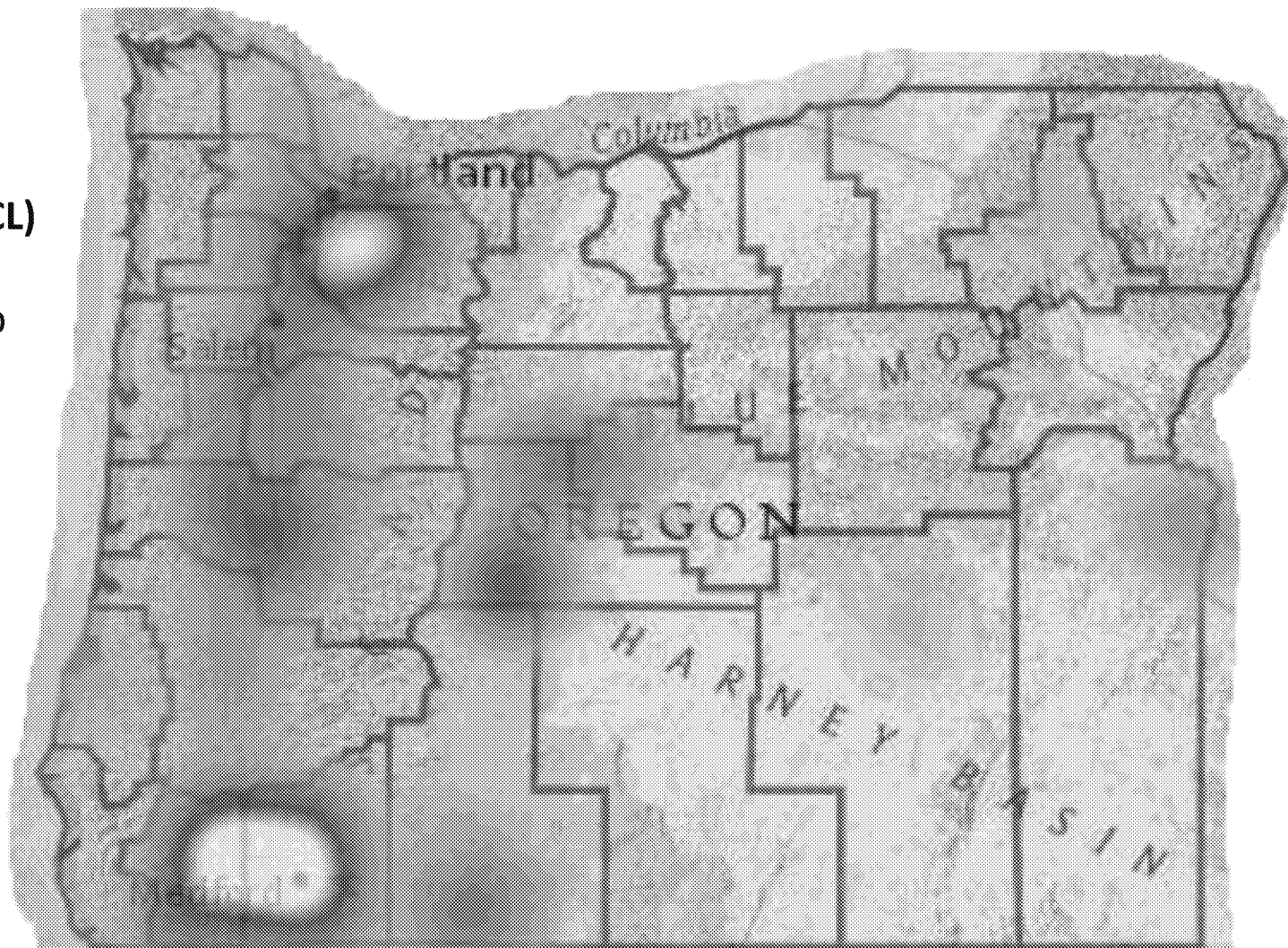


Ayotte et al., Environ. Sci. Technol.  
2017, 51, 12443-12454

<https://www.usgs.gov/media/images/estimated-population-arsenic-greater-10-micrograms-liter>

# Heat Map of Arsenic in Private Wells: Domestic Well Testing Act Data, 1989-2018

Range 0-850 ppb  
Mean = 2.5 ppb  
**9.9% >10 ppb (MCL)**  
5.8% 5-10 ppb  
24.1% 0.1 - <5 ppb  
(11,596 tests)



Yellow represents the highest results, blue the lowest, zero values not shown.

# n Domestic Well Testing

Wells Arsenic Nitrate Nitrate: A Deeper Look About Us

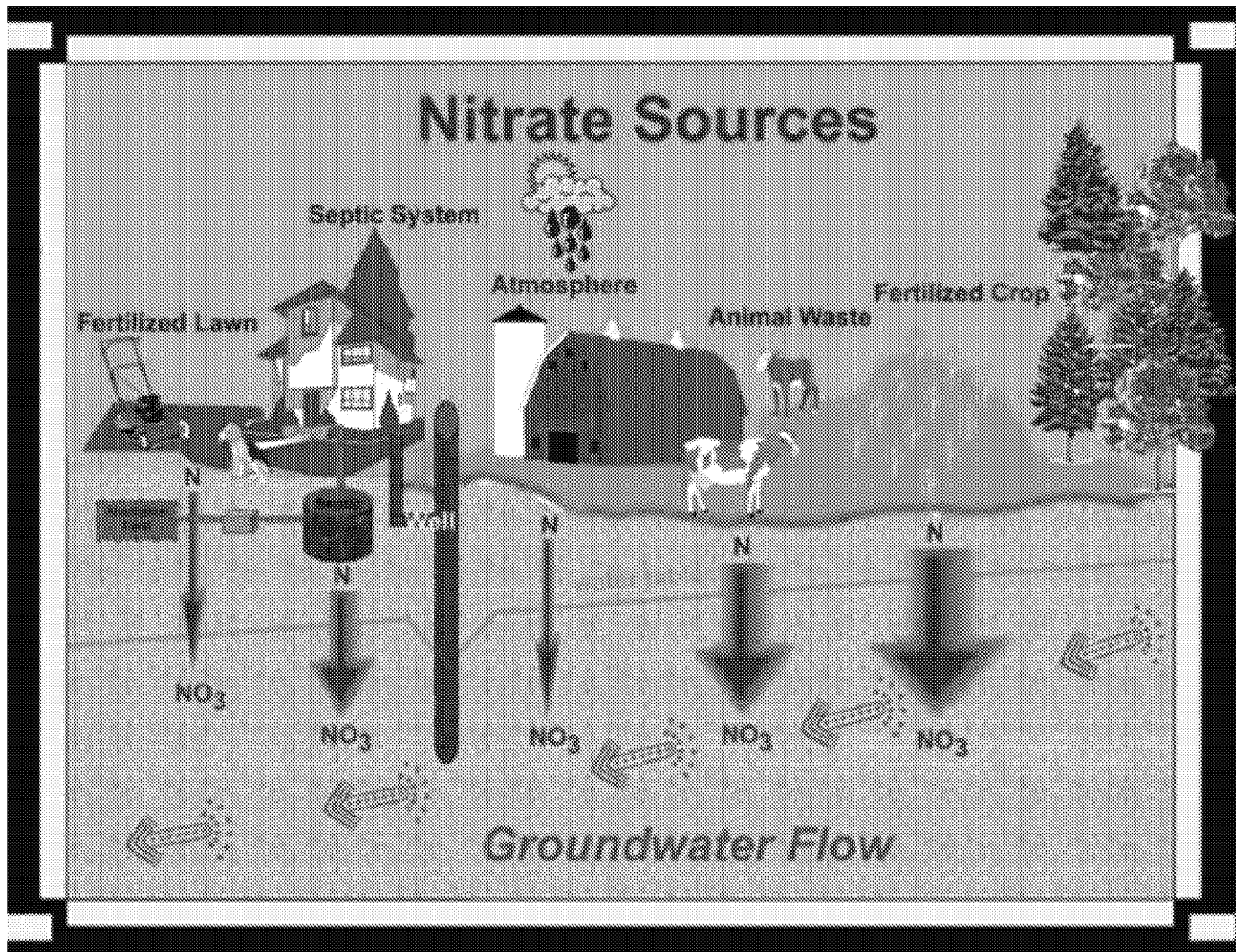




- ◆ Drinking water standard (MCL): 10 ppm
- ◆ Health Effects: reproductive anomalies, cancer, blue baby syndrome (methemoglobinemia); N-nitroso *compounds linked to colorectal cancers, thyroid disease and neural tube defects at <10 ppm* [Ward et al 2018]
- ◆ Recommended testing: annually

CONTAMINANTS

Oregon  
Health  
Authority



Wisconsin County Extension office

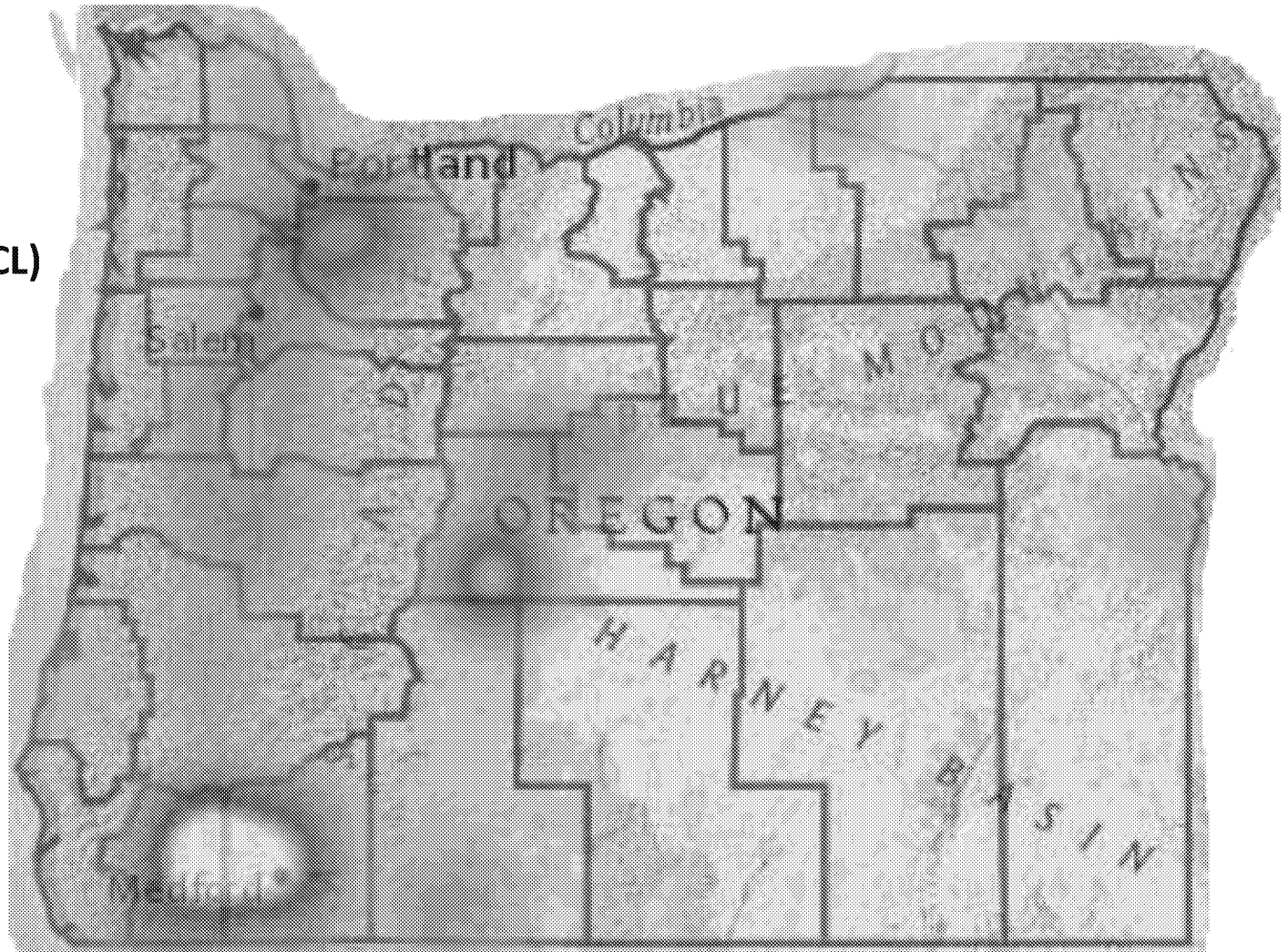
**NITRATES**

Oregon  
**Health**  
Authority



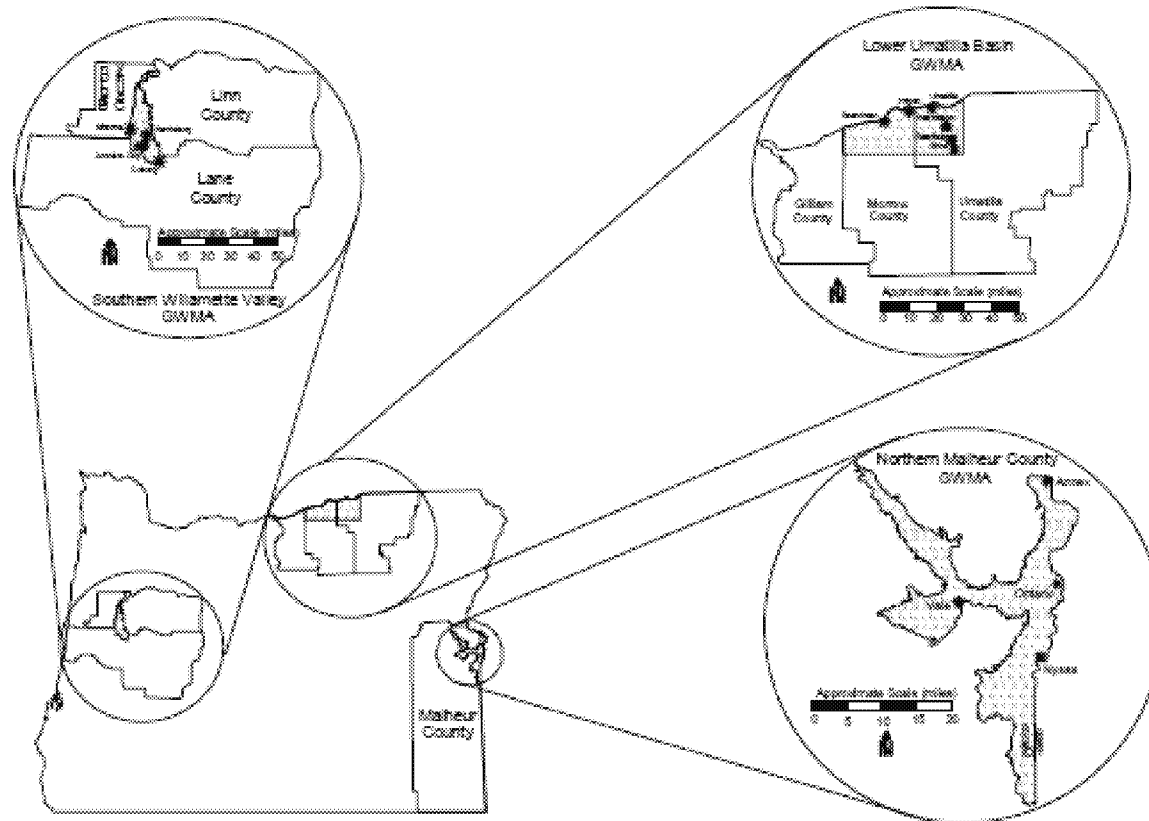
# Heat Map of Nitrates in Private Wells: Domestic Well Testing Act Data, 1989-2018

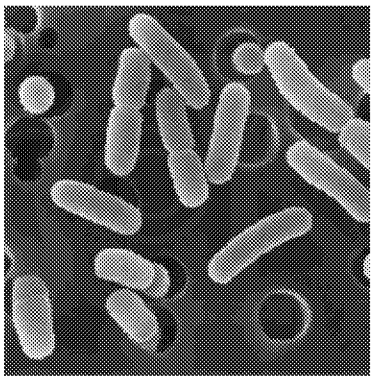
Range 0-118 ppm  
Mean = 1.3 ppm  
**1.5% >10 ppm (MCL)**  
3.5% >7 ppm  
(25,778 tests)



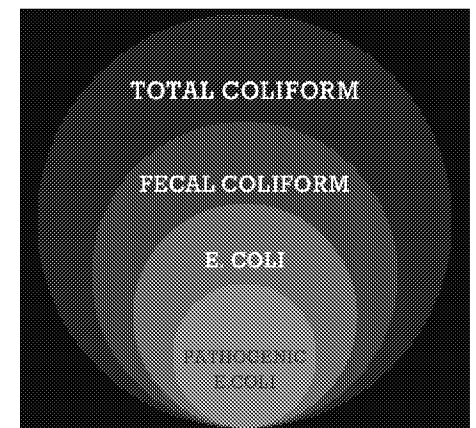
Yellow represents the highest results, blue the lowest, zero values not shown.

# Groundwater Management Areas (GWMA)s





## Total Coliform & E. coli Bacteria MCL = Absent



- 💧 *E. coli Bacteria The presence of E. coli in a water sample indicates that the water has been contaminated by sewage or animal waste that may contain disease causing bacteria.*
- 💧 Health Effects: nausea, vomiting, diarrhea, jaundice, headache
- 💧 Recommended testing: annually
- 💧 **Total Coliform (TC) detected in 10.5% of samples (n=3,036)**
- 💧 **E Coli detected in 1.8% of TC samples (n=56)**

## CONTAMINANTS

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- 💧 **Ongoing Projects**

PRESENTATION



- County and Census Tract level map update on DWSP web site
- Mini-grants to Lincoln and Josephine counties
- Cluster analysis for Arsenic and Nitrate
- Incorporate DEQ lab data
- Database updates
- Assessment Surveys
  - Well Users
  - Stakeholders

## ONGOING PROJECTS

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- ◆ Target outreach efforts to include hazard areas identified in data analysis
- ◆ Increased DWTA compliance through outreach efforts and partnerships
- ◆ Small grants to county health departments
- ◆ Add data to Oregon Tracking Portal

# Available Webinar



## **What Realtors Need to Know about Homes with Well Water**

<http://privatewellclass.org/calendar>

The Private Well Class is a collaboration between the Rural Community Assistance Partnership and the University of Illinois, through the Illinois State Water Survey and the Illinois Water Resources Center, and funded by the U. S. Environmental Protection Agency.



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# Thank you!

# Questions?



Visit us at: [healthoregon.org/wells](http://healthoregon.org/wells)

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